California Air Resources Board

User Guide

California Air Resources Board
Funding Agricultural Replacement Measures for Emission Reductions Program

California Climate Investments

Final
April 12, 2019

Disclaimer:

- This tool is designed to calculate emission reductions, cost-effectiveness, and maximum grant amounts. While every effort has been exhausted and made to ensure that the calculations are accurate and consistent with applicable program guidelines, determining final project eligibility and verifying outputs generated by the tool is the responsibility of district staff.

Table of Contents

Section A. Introduction

The California Air Resources Board (CARB) Funding Agricultural Replacement Measures for Emissions Reductions (FARMER) program reduces greenhouse gas (GHG) emissions by replacing older, higher-emitting agricultural equipment/vehicles with newer, more efficient equipment/vehicles. For the FARMER Program, CARB staff developed the FARMER Benefits Calculator Tool and accompanying FARMER Quantification Methodology to provide guidance for estimating the GHG emission reductions and selected co-benefits of each proposed project type. This User Guide provides instructions for using the FARMER Benefits Calculator Tool (Section B) and presents some hypothetical example projects (Section C).

The FARMER Benefits Calculator Tool and supporting FARMER Quantification Methodology are available for download at: www.arb.ca.gov/cci-resources. Methods and equations used in the FARMER Benefits Calculator Tool for estimating GHG emission reductions and air pollutant emission co-benefits are provided in the FARMER Quantification Methodology.

Program Assistance

Applicants should use the following resources for additional questions and comments:

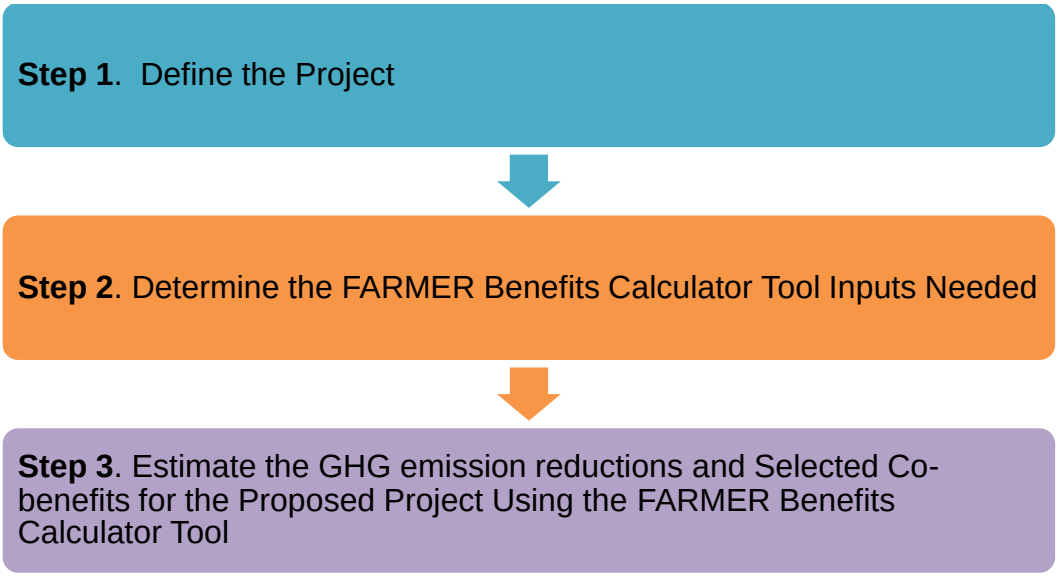
- Questions on this document should be sent to: GGRFProgram@arb.ca.gov.
- For more information on CARB's efforts to support implementation of California Climate Investments, see: www.arb.ca.gov/auctionproceeds.
- Questions pertaining to the FARMER program should be sent to farmer@arb.ca.gov.

Section B. Step-by-Step Guide

Overview

Applicants will follow the steps outlined in Figure 1 to estimate the GHG emission reductions and selected co-benefits from the proposed project. Detailed instructions for each step are provided on subsequent pages. Example projects showing how to estimate the GHG emission reductions and selected co-benefits from a given project are included in Section C.

Figure 1. Steps to Estimating GHG Emission Reductions and Selected Co-benefits



Step 1: Define the Project

CARB developed the following project types that meet the objectives of the FARMER Program[1] and for which there are methods to quantify GHG emission reductions:

1. On-road heavy-duty truck replacement and repower projects
    - **Moyer On-Road Heavy-Duty Trucks:** Carl Moyer Program-eligible project category
    - **FARMER On-Road Heavy-Duty Trucks (new/used):** FARMER On-Road FARMER project category
2. Off-road equipment replacement and repower projects
    - **Off-Road Agricultural Equipment:** One-for-one transaction where a single baseline equipment is scrapped and a single replacement equipment is procured
    - **Off-Road Agricultural Equipment: 2 (or-more)-for-1**: In some cases, the replacement equipment is no longer available at similar horsepower ratings to the baseline equipment so the procurement of the higher horsepower equipment is allowed (additionally, multiple pieces of equipment may be scrapped to make the project more cost-effective,– also referred to as “2 (or more)-for-1”)
3. Replacement and repower for irrigation pump engines
    - **Irrigation Pump Engines:** One-for-one transaction where a single baseline pump is scrapped and a single replacement pump is procured
    - **Irrigation Pump Engines: 2 (or-more)-for-1:** In some cases, the replacement pump is no longer available at similar horsepower ratings to the baseline equipment so the procurement of the higher horsepower pump is allowed (additionally, multiple pieces of equipment may be scrapped to make the project more cost-effective,– also referred to as “2 (or more)-for-1”)
4. Zero-emission utility terrain vehicles
    - **ZEV_Ag_UTV:** Rebates for the purchase of zero-emission utility terrain vehicles (UTV)
5. Agricultural Trade-Up (Ag Trade-Up) Pilot
    - **Ag Trade-Up #1**: Transaction #1 - replacing off-road equipment with new off-road equipment
    - **Ag Trade-Up #2:** Transaction #2 - replacing off-road equipment with the old off-road equipment that was replaced in Transaction #1

[1] https://ww2.arb.ca.gov/our-work/programs/farmer-program

6. Infrastructure
    - **Infrastructure (tied to project directly above):** Infrastructure[2] that is meant to support a project from #1-4

For each single project, users must define it in the FARMER Benefits Calculator tool by identifying its applicable, eligible Project Type. Users can use the tool to estimate the GHG emission reductions and selected co-benefits for many projects spanning the myriad of eligible project types.

Moreover, when a project has associated infrastructure, users can select the "Infrastructure (tied to project directly above):" option. See Example Projects section for an example of a project with infrastructure.

[2] Refer to the Carl Moyer Guidelines for guidance on eligible infrastructure: https://www.arb.ca.gov/msprog/moyer/guidelines/current.htm

Step 2: Determine the FARMER Program Benefits Calculator Tool Inputs Needed

Table 1 identifies the required data inputs needed to estimate the GHG emission reductions and selected co-benefits for the proposed project with the FARMER Benefits Calculator Tool by project type. **Users should input data within the tool from Left-to-Right as well as Top-to-Bottom.**

Table 1. Required FARMER Benefits Calculator Tool General Information and Priority Population Benefits Inputs for Eligible Project Types (All Projects)

ALL PROJECTS

General Information (Air District Info tab)
• Air District Name;
• Contact Name;
• Contact Phone Number;
• Contact Email;
• Date of Submission;
• Quarterly Reporting Period or Annual Reporting Year;
• Work expected to be completed by next progress report;
• Any problems or issues encountered during quarter? (If so, please provide information on how this may impact the project(s)' outcome); and
• If project(s) are behind the schedule of the grant agreement, please explain any reasons for delay and how the schedule will be resumed.
 	
Basic Project Information and Information Regarding Priority Populations (Project Profile tab)
• Project Type;
• District Supplied Project ID;
• Number of baseline equipment/vehicle(s) being scrapped for 2 (or more)-for-1;
• Project mailing address and latitude/longitude data;
• Carl Moyer Guidelines Version (year);
• Project milestones;
  ○ Contract execution date
  ○ Post-inspection date
  ○ Date of payment
• Questions regarding project benefits to a Priority Population (disadvantaged community, low-income community or household, or low-income community within ½-mile of a disadvantaged community) based on Assembly Bill 1550 (users can check if their project is located within a Priority Population using the map found here: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/communityinvestments.htm);

- Community needs met by the project (select from one of the Step 2 options: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/ccidoc/criteriatable/criteria-table-cte.pdf), if any;
- Written description of community needs that the project meets;
- Community benefits provided by the project (select from one of the Step 2 options: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/ccidoc/criteriatable/criteria-table-cte.pdf), if any;
- Written description of the benefits that the project provides; and
- Average Annual Use During Project Life (i.e., usage):
  - Numerical Value
  - Units

In addition to quantitative project inputs that enable districts to determine incentive amounts, GHG emissions, and co-benefits, the FARMER Benefits Calculator Tool also collects information regarding project benefits to Priority Populations. Priority Populations are defined in CARB's Funding Guidelines as disadvantaged communities, low-income communities, and/or low-income households. To provide information regarding benefits to Priority Populations, users only need to answer three questions and provide two written descriptions. They can fill out the answers for each project line item using the drop-down lists in the "Priority Population" columns as shown in Figure 2.

Figure 2: Screenshot of columns in the Quantification Inputs tab related to Priority Population benefits

Project Located Within:			Community Need Addressed	Written description of the identified community or household need	Benefit Criteria Met	Written description of the benefits to priority populations
Disadvantaged Community?	Low-income Community or Low-income Household?	1/2-mile Low-income Buffer Region?				

1. Is the project located within a disadvantaged community, low-income community or household, or within a low-income community or low-income household that is within ½-mile of a disadvantaged community (Yes/No)

2. Does the project address a community need? Please refer to Step 2 of the Clean Transportation and Equipment Criteria Table[3] shown in Figure 3 to determine which criteria is most applicable to your project and select from the drop down list. Please also provide a written description of the identified community or household need.

[3] Link: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/ccidoc/criteriatable/criteria-table-cte.pdf

Figure 3: Step 2 in the Clean Transportation and Equipment Criteria Table per CARB's 2018 Funding Guidelines

Step 2 – Address a Need. *Identify an important community or household need and evaluate whether the project provides a benefit that meaningfully addresses that need.*

To identify a need that the project will address, agencies and/or applicants can use a variety of approaches:

- ❒ A. ***Recommended Approach:*** Host community meetings, workshops, outreach efforts, or public meetings as part of the planning process to engage local residents and community groups for input on community or household needs, and document how the received input was considered in the design and/or selection of projects to address those needs;
- ❒ B. ***Recommended Approach:*** Receive documentation of support from local community-based organizations and/or residents (e.g., letters, emails) identifying a need that the project addresses and demonstrating that the project has broad community support;
- ❒ C. ***Alternative Approach:*** Where direct engagement is infeasible, look at the individual factors in CalEnviroScreen that are most impacting an identified disadvantaged or low-income community (i.e., factors that score above the 75th percentile), and confirm that the project will reduce the impacts of at least one of those factors; or
- ❒ D. ***Alternative Approach:*** Where direct engagement is infeasible, refer to the list of common needs for priority populations in CARB's Funding Guidelines Table 5 and confirm that the project addresses at least one listed need.

3. Does the project provide a benefit? Please refer to Step 3 of the Clean Transportation and Equipment Criteria Table[3] shown in Figure 4 to determine which criteria is most applicable to your project and select from the drop down list. Please also provide a written description of the benefits to the Priority Populations.

Figure 4: Step 3 in the Clean Transportation and Equipment Criteria Table per CARB's 2018 Funding Guidelines

Step 3 – Provide a Benefit. *Evaluate the project against each of the following criteria to determine if it provides direct, meaningful, and assured benefits to priority populations. The benefit provided must directly address the identified need.*

Project must meet at least one of the following benefit criteria:

- ❒ A. Project provides incentives for vehicles, equipment, or renewable transportation fuel that reduce criteria air pollutant or toxic air contaminant emissions, such as diesel particulate matter;
- ❒ B. Project provides greater mobility and increased access to clean transportation for residents of a disadvantaged or low-income community by placing services in that community, including ride-sharing, car-sharing, or other advanced technology mobility options (e.g., neighborhood electric vehicles, vanpooling, shuttles, smartphone application-based ride-sharing services, bike-sharing services);
- ❒ C. Project provides greater mobility and increased access to clean transportation for residents of a disadvantaged or low-income community, or a low-income household, by providing incentives for the retirement or replacement of older, higher-emitting vehicles.

Table 2: Required FARMER Benefits Calculator Tool Quantification Inputs for Eligible Project Types (Project Type Specific) and Funding Incentive Inputs (All Projects)

On-Road Heavy-Duty Truck Replacement and Repower Projects
Quantification Inputs (Quantification Inputs tab) <u>Basic Information, Baseline and Replacement Equipment/Vehicle:</u> • Two-Step Cost-Effectiveness Calculation Applicability (only for Carl Moyer Program-eligible project category and if the vehicle is used); • Number of Vehicles in Fleet; • Expected First Year of Operation (i.e., implementation year); • Quantification Period; • Quantification Period II (only for two-step eligible projects); • Annual Miles Traveled; • Odometer Reading (only for FARMER Program-eligible project category and if the vehicle is used) • Engine Model Year; • Equipment/Vehicle Model Year; • Fuel Type; • Vehicle Serial Number; • Engine Serial Number; • Engine Family Name; • Engine Displacement (liters); • Engine Standard (this input may/may not be applicable depending on engine model year); • Gross Vehicle Weight Rating; • Intended service Class; and • Other Installed Emissions Controls.

Off-Road Ag Equipment Replacement and Repower Projects

Quantification Inputs (Quantification Inputs tab)

Basic Information, Baseline and Replacement Equipment/Vehicle:

- Expected First Year of Operation (i.e., implementation year);
- Quantification Period;
- Annual Average Hours of Operation;
- Type of Off-Road Project;
- Engine Model Year;
- Equipment/Vehicle Model Year;
- Fuel Type;
- Vehicle Serial Number;
- Engine Serial Number;
- Engine Family Name;
- Engine Displacement (liters);
- Equipment Type (input only for baseline equipment/vehicle; replacement equipment/vehicle is assumed to be same type as baseline);
- Horsepower; and
- Engine Tier (only for diesel engines).

Irrigation Pumps Engines[4]

Quantification Inputs (Quantification Inputs tab)

Basic Information, Baseline and Replacement Equipment:

- Two-Step Cost-Effectiveness Calculation Applicability;
- Expected First Year of Operation (i.e., implementation year);
- Quantification Period;
- Quantification Period II (only for two-step eligible projects);
- Annual Average Hours of Operation;
- Type of Off-Road Project;
- Engine Model Year;
- Fuel Type;
- Engine Serial Number;
- Engine Family Name;
- Engine Displacement (liters);
- Equipment Type (input only for baseline equipment/vehicle; replacement equipment/vehicle is assumed to be same type as baseline);
- Horsepower; and
- Engine Tier (only for diesel engines).

[4] Applicants have the option of scrapping multiple baseline irrigation pumps for a single replacement. In such as case, the project becomes similar to a 2 (or more)-for-1 Off-road equipment and repower project

Zero-Emission Agricultural UTVs

Quantification Inputs (Quantification Inputs tab)

Basic Information, Baseline and Replacement Vehicle:

- Expected First Year of Operation (i.e., implementation year);
- Quantification Period;
- Annual Average Hours of Operation;
- Type of Off-Road Project;
- Engine Model Year;
- Equipment/Vehicle Model Year;
- Fuel Type;
- Vehicle Serial Number;
- Engine Serial Number;
- Engine Family Name (only for baseline equipment; not applicable to ZEV UTV);
- Engine Displacement (only for baseline equipment; not applicable to ZEV UTV);
- Equipment Type (only for baseline equipment; not applicable to ZEV UTV);
- Horsepower;
- Engine Tier (only for diesel baseline equipment); and
- Engine Cycle Type (only for gasoline baseline equipment <25hp).

Agricultural Trade-Up

Quantification Inputs (Quantification Inputs tab)

Basic Information, Baseline and Replacement Equipment/Vehicle:

- Expected First Year of Operation (i.e., implementation year);
- Quantification Period;
- Annual Average Hours of Operation;
- Type of Off-Road Project;
- Engine Model Year;
- Equipment/Vehicle Model Year;
- Fuel Type;
- Vehicle Serial Number;
- Engine Serial Number;
- Engine Family Name;
- Engine Displacement;
- Equipment Type;
- Horsepower; and
- Engine Tier (only for diesel equipment).

Off-road equipment replacement and repower projects: 2 (or more)-for-1
Quantification Inputs (Quantification Inputs tab) <u>Basic Information, Baseline and Replacement Equipment:</u> • Expected First Year of Operation (i.e., implementation year); • Quantification Period; • Annual Average Hours of Operation; • Type of Off-Road Project; • Engine Model Year; • Vehicle Model Year; • Fuel Type; • Vehicle Serial Number; • Engine Serial Number; • Engine Family Name; • Engine Displacement (liters); • Equipment Type; • Horsepower; and • Engine Tier (only for diesel engines).
Infrastructure[5]
Quantification Inputs (Quantification Inputs tab) <u>Basic Information:</u> • Expected First Year of Operation (i.e., implementation year); • Quantification Period; and • Type of Off-Road Project (this refers to the type of Infrastructure project).
ALL PROJECTS
Basic Information on Funding Sources and Incentive Amount Calculations (Funding Inputs-Incentive Calcs tab) • New Vehicle/Equipment Cost; • Project Funding Sources; and • User Defined Incentive Amount.

[5] Infrastructure cannot be a standalone project. It must be associated with one of the aforementioned project types (#1-4)

Since the initial release of the FARMER Benefits tool, feedback from users continues to help shape the design and functionality of the tool. The addition of the “Project Implementation Costs” tab was meant to help users report on the associated costs with implementing the FARMER program and awarding grants. Users can specify whether an implementation cost is associated with staffing/jobs, travel, outreach, or other. Users then proceed to provide extra information regarding the types of and quality of jobs funded as well as hourly wages, fringe costs, among others. The total of the project implementation costs must agree with the information in the “Fiscal Reporting Summary” tab or the user will be receive a warning prompt. Total salary costs are calculated for the user based on the inputs.

In addition to the “Project Implementation Costs” tab, the FARMER Benefits tool now also features a “Fiscal Reporting Summary” tab. Based on the dates that users specify in the “Project Profile” tab as well as the funding source and fiscal year information inputted in the “Funding Inputs-Incentive Calcs” tab, the “Fiscal Reporting Summary” tab is meant to help users by tracking and automatically calculating the amount of funding they have under contract, have expended, and so forth.

For questions on the “Project Implementation Costs” tab or the “Fiscal Reporting Summary” tab, please direct them to: farmer@arb.ca.gov

Step 3: Estimate GHG Emission Reductions and Selected Co-Benefits for the Proposed Project Using the FARMER Benefits Calculator Tool

Users must use the FARMER Benefits Calculator Tool to complete this step. The FARMER Benefits Calculator Tool can be downloaded from: www.arb.ca.gov/cci-resources.

Users will follow the steps outlined in Figure 5 to input information into the FARMER Benefits Calculator Tool's various tabs. Users should begin with the **Air District Info** tab, which contains general information about the Benefits Calculator Tool. Key terms used throughout the FARMER Benefits Calculator Tool are defined in the **Definitions** tab.

The **Project Profile** tab prompts users to enter general project information.

The **Quantification Inputs** tab identifies inputs required by the user, generally requiring project-specific data or assumptions. Input and output fields are color coded:

- Green fields indicate direct user input is required.
- Blue fields are optional and user input is not required.
- Grey fields indicate output or calculation fields that are automatically populated based on user entries and the calculation methods.
- Yellow fields offer helpful hints or important tips to the user.
- Black (Black) fields are not applicable and no user input is necessary.

The **GHG & Co-Ben Aggregate**[6] tab displays the estimated:

- Total GHG emission reductions by project type (metric tons of carbon dioxide equivalent ($MTCO_2e$))[7]
- Total Particulate Matter ($PM_{2.5}$)[8] emission reductions by project type (US tons/yr[9], pounds(lbs)/yr);
- Total Nitrogen Oxides (NO_x) emission reductions by project type (US tons/yr, lbs/yr);

[6] The tabs corresponding to GHG and Co-benefits present the results in total, but also prorated based on funding source that the FARMER Program is utilizing – e.g., prorated based on funding that comes from the Greenhouse Gas Reduction Fund (GGRF), funding that comes from other GGRF programs, funding that comes from other initiatives such as the Air Quality Improvement Fund (AQIF) and the Alternative and Renewable Fuel; and Vehicle Technology Fund (ARFVTF), funding generated from the interest gained on these funds, among other sources.

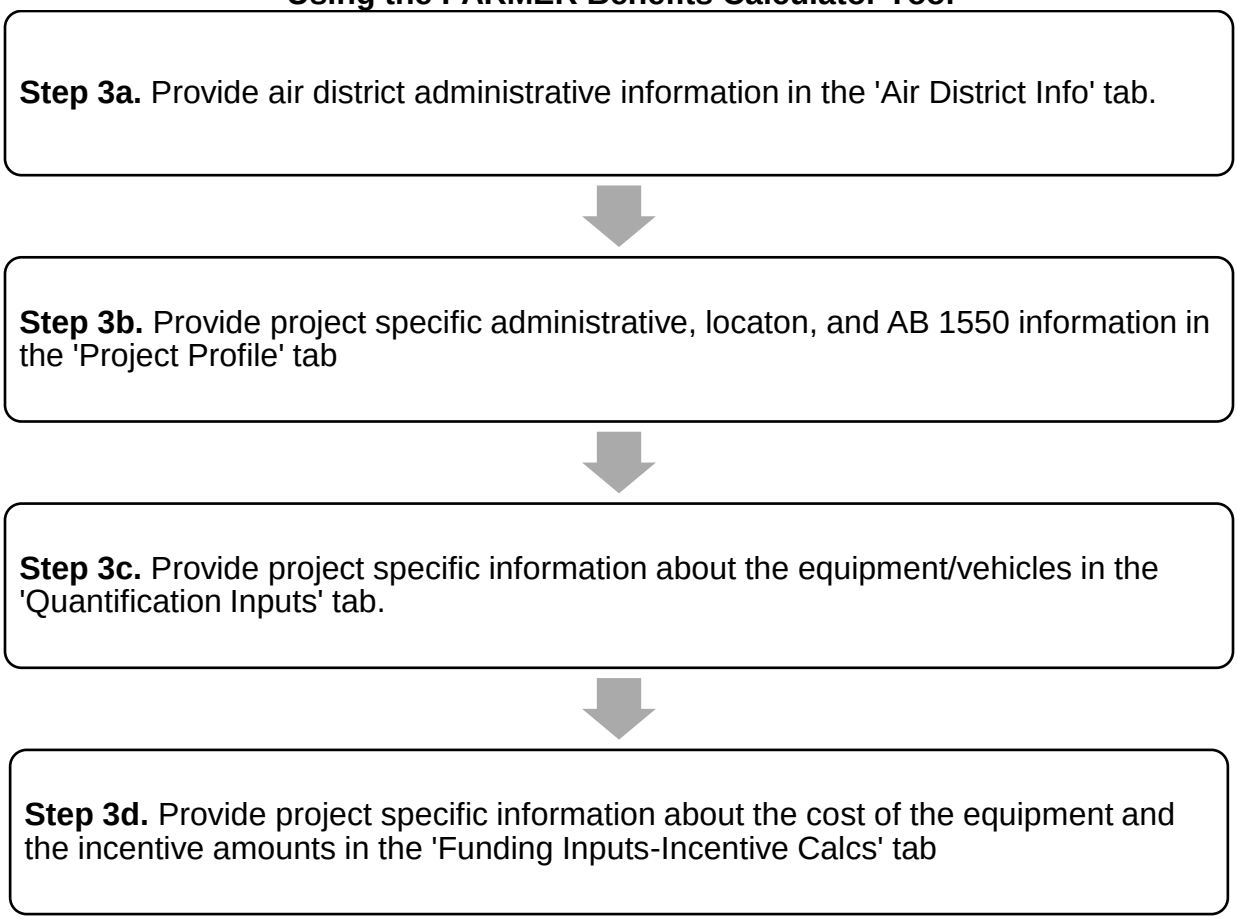
[7] This is the portion of GHG emission reductions attributable to funding from the FARMER Program; GHG emission reductions are prorated according to the level of program funding contributed from the FARMER Program and other California Climate Investments programs funded with GGRF, as applicable. The results in the Co-benefits Summary tab are prorated using the same approach, as applicable.

[8] $PM_{2.5}$ refers to particulate matter at 2.5 microns or less

[9] In the Calculator tool, US tons/yr is denoted as "tpy"

- Total ROG (reactive organic gas) emission reductions by project type (US tons/yr, lbs/yr);
- Total Diesel PM emission reductions by project type (US tons/yr, lbs/yr);
- Total Fuel Reduction by project type (diesel gallon equivalent);
- Total Fuel Savings by project type – based on Diesel Gallon Equivalent ($); and
- Total Fossil Fuel Energy Use Reductions (kilowatt-hours (kWh)).

Figure 5: Work Flow for Step 3 to Estimate the GHG Emission Reductions, Selected Co-Benefits, and Recommended Incentive Amounts for the Proposed Using the FARMER Benefits Calculator Tool



The **GHG Summary** tab displays the estimated:

- FARMER GHG emission reductions ($MTCO_2e$); [10]
- GHG emission reductions ($MTCO_2e$);

The **Co-benefits Summary** tab displays the estimated:

- $PM_{2.5}$ emission reductions (US tons/yr; lbs/yr);
- NO_x emission reductions (US tons/yr; lbs/yr);
- ROG emission reductions (US tons/yr; lbs/yr);
- Diesel PM emission reductions (US tons/yr; lbs/yr);
- Fuel Reduction (Diesel Gallon Equivalent);
- Fuel Savings – based on Diesel Gallon Equivalent ($); and
- Fossil Fuel Energy Use Reductions (kWh).

The **Funding Inputs-Incentive Calcs** tab displays the estimated:

- Cost-effectiveness in terms of public dollars invested per ton of weighted criteria emission reductions ($/ton);
- GHG emission reductions per FARMER GGRF funds ($MTCO_2e$/$); and
- Maximum Eligible Incentive Amount ($).

[10] This is the portion of GHG emission reductions attributable to funding from the FARMER Program; GHG emission reductions are prorated according to the level of program funding contributed from the FARMER Program and other California Climate Investments programs funded with GGRF, as applicable. The results in the Co-benefits Summary tab are prorated using the same approach, as applicable.

Section C. Example Projects

Introduction

The following are hypothetical projects[11] to demonstrate how the FARMER Benefits Calculator Tool would be applied. These hypothetical projects do not provide examples of the supporting documentation that is required of actual project applicants.

Example Project I

Overview of the proposed project

The proposed project is an Ag Trade-Up project with the following features:

- New Tier 4 Final agricultural tractor being purchased by Farmer #1
- Existing Tier 3 Agricultural tractor that Farmer #1 will replace with the new Tier 4 Final tractor
- Farmer #2 that will scrap his/her Tier 0 tractor and receive Farmer #1's used Tier 3 tractor

The proposed project is located in San Joaquin County with the following project characteristics:

- Farmer #1 primarily operates his/her tractor within a Disadvantaged community
- Farmer #2 primarily operates his/her tractor within a Low-Income community

[11] The hypothetical project has not undergone verification of any FARMER Program requirements; all assumptions about location type and project features are for FARMER Benefits Calculator Tool demonstration purposes only.

Methods to apply

Step 1: Define the Project

Define the Project in the "Project Profile" Tab

Farmer #1 buying a new Tier 4 Final tractor to replace his/her Tier 3 tractor:

Table 3: Ag Trade-Up Transaction #1

Ag Trade-Up #1	
FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	**User-Defined Inputs**
Project Type	Ag Trade-Up #1
District Supplied Project ID	1
# of Baseline Equipment/Vehicle being scrapped for 2-for-1	Not Applicable
Mailing Address: Street Name	123 ABC Road
Mailing Address: City	TestCity
Mailing Address: State	CA
Mailing Address: Zip Code	12345
Vehicle/Equipment Latitude (degrees)	37.726039
Vehicle/Equipment Longitude (degrees)	-121.229604
Carl Moyer Guidelines Version	2017
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Project Located Within Disadvantaged Community?	Yes
Project Located Within Low-income Community or Low-income Household?	No
Project Located Within 1/2-mile Low-income Buffer Region?	No
Community Need Addressed	D (Refer to the list of common needs for priority populations in CARB's Funding Guidelines Table 5 and confirm that the project addresses at least one listed need.)
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.
Benefit Criteria Met	A (Project provides incentives for vehicles, equipment, or renewable transportation fuel that reduce criteria air pollutant or toxic air contaminant emissions, such as diesel particulate matter)
Written description of the benefits to priority populations	This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.
Average Annual Use During Project Life: Numerical Value	250
Average Annual Use During Project Life: Units	hours

For Ag Trade-Up projects, the next row down in the Calculator Tool is used to input information on the Traction #2 vehicle replacement.

Farmer #2 receiving the Tier 3 tractor from Farmer #1 after it has been reconditioned enabling him/her to scrap his/her Tier 0 tractor:

Table 4: Ag Trade-Up Transaction #2 – Project Profile

Ag Trade-Up #2	
FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	**User-Defined Inputs**
Project Type	Ag Trade-Up #2
District Supplied Project ID	2
# of Baseline Equipment/Vehicle being scrapped for 2-for-1	Not Applicable
Mailing Address: Street Name	456 ABC Road
Mailing Address: City	AnotherTestCity
Mailing Address: State	CA
Mailing Address: Zip Code	98765
Vehicle/Equipment Latitude (degrees)	37.696455
Vehicle/Equipment Longitude (degrees)	-121.336004
Carl Moyer Guidelines Version	2017
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Project Located Within Disadvantaged Community?	No
Project Located Within Low-income Community or Low-income Household?	Yes
Project Located Within 1/2-mile Low-income Buffer Region?	No
Community Need Addressed	D (Refer to the list of common needs for priority populations in CARB's Funding Guidelines Table 5 and confirm that the project addresses at least one listed need.)
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.
Benefit Criteria Met	A (Project provides incentives for vehicles, equipment, or renewable transportation fuel that reduce criteria air pollutant or toxic air contaminant emissions, such as diesel particulate matter)
Written description of the benefits to priority populations	This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.
Average Annual Use During Project Life: Numerical Value	250
Average Annual Use During Project Life: Units	hours

Figure 6-Figure 8 shows how the project profile information from Table 3-Table 4 is inputted into the tool.

Figure 6: Screenshot of Project Profile Tab – Location Information

*Project Type	*District Supplied Project ID (must be filled out for proper calculations)	*# of Baseline Equipment/Vehicle being scrapped for 2-for-1	Mailing Address: Street Name	Mailing Address: City	Mailing Address: State	Mailing Address: Zip Code	Vehicle/Equipment Latitude (degrees)	Vehicle/Equipment Longitude (degrees)
Ag Trade-Up #1	1		123 ABC Road	TestCity	CA	12345	37.726039	-121.229604
Ag Trade-Up #2	2		456 ABC Road	AnotherTestCity	CA	98765	37.696455	-121.336004

Figure 7: Screenshot of Project Profile Tab – Dates

Carl Moyer Guidelines Version	Contract Execution Date	Post-Inspection Date	Date of Payment
2017	1/1/2019	2/1/2019	3/1/2019
2017	1/1/2019	2/1/2019	3/1/2019

Figure 8: Screenshot of Project Profile Tab – Columns regarding benefits to Priority Populations

Project Located Within:			Community Need Addressed	**Written description of the identified community or household need	Benefit Criteria Met	**Written description of the benefits to priority populations	**Written description of any Project Co-benefits
Disadvantaged Community?	Low-income Community or Low-income Household?	1/2-mile Low-income Buffer Region?					
Yes	No	No	D	This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.	A	This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.	This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.
No	Yes	No	D	This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.	A	This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.	This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.

Figure 9[12] shows two new columns that were added to the Project Profile tab. These columns provide a space for users to track and report on the average annual usage (in miles, hrs, or kWh within a given year).

Figure 9: Tracking and Reporting of Average Annual Use During Project Life within the Project Profile tab

Average Annual Use During Project Life:	
Numerical Value	**Units**
250	hours
250	hours

Step 2: Determine the FARMER Benefits Calculator Tool Inputs Needed

Inputs for the Baseline and Replacement Equipment/Vehicles in the "Quantification Inputs" Tab

Information on the "Project Type" and "District Supplied Project ID" will auto-populate based upon inputs in the "Project Profile" tab.

[12] Tracking and reporting of Average Annual Use During Project Life reflects a new modification to this latest version of the FARMER Benefits Calculator tool.

Farmer #1 buying a new Tier 4 Final tractor to replace his/her Tier 3 tractor:

Table 5: Ag Trade-Up Transaction #1 – Quantification Inputs

Ag Trade-Up #1		
FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	**FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab**	**User-Defined Inputs**
Basic Information	**Is project eligible for Carl Moyer 2-Step Calculation?**	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2018
	Quantification Period (yrs)	10
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	1000
	Type of Off-Road Project	Replacement
Current (Baseline) Vehicle/Equipment	**Engine Model Year**	2010
	Vehicle Model Year	2010
	Fuel Type	Diesel
	Vehicle Serial Number	1111
	Engine Serial Number	2222
	Engine Family Name	Test
	Engine Displacement (liters)	10
	Engine Standard	Not Applicable
	Equipment Type	Agricultural Tractors
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	200
	Tier	3
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable
	Engine cycle type	Not Applicable
New (Replacement) Vehicle/Equipment	**Engine Model Year**	2017
	Vehicle Model Year	2017
	Fuel Type	Diesel
	Vehicle Serial Number	3333
	Engine Serial Number	4444
	Engine Family Name	Test
	Engine Displacement (liters)	10
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	250
	Tier	4_Final
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable

For Ag Trade-Up projects, the next row down in the tool is used to input information on the Transaction #2 vehicle replacement. See Figure 10-Figure 12 which shows how the inputs listed in Table 5-Table 6 should be entered in the tool.

Farmer #2 receiving the Tier 3 tractor from Farmer #1 after it has been reconditioned enabling him/her to scrap his/her Tier 0 tractor:

Table 6: Ag Trade-Up Transaction #2 – Quantification Inputs

Ag Trade-Up #2		
FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	**FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab**	**User-Defined Inputs**
Basic Information	**Is project eligible for Carl Moyer 2-Step Calculation?**	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2018
	Quantification Period (yrs)	3
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	300
	Type of Off-Road Project	Replacement
Current (Baseline) Vehicle/Equipment	**Engine Model Year**	2000
	Vehicle Model Year	2000
	Fuel Type	Diesel
	Vehicle Serial Number	5555
	Engine Serial Number	6666
	Engine Family Name	Test
	Engine Displacement (liters)	5
	Engine Standard	Not Applicable
	Equipment Type	Agricultural Tractors
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	175
	Tier	0
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable
	Engine cycle type	Not Applicable
New (Replacement) Vehicle/Equipment	**Engine Model Year**	2010
	Vehicle Model Year	2010
	Fuel Type	Diesel
	Vehicle Serial Number	1111
	Engine Serial Number	2222
	Engine Family Name	Test
	Engine Displacement (liters)	10
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	200
	Tier	3
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable

Figure 10: Screenshot of basic information – Quantification Inputs Tab

Basic Information										
Project Type	**District Supplied Project ID**	***Is project eligible for Carl Moyer 2-Step Calculation?**	***Number of vehicles in Fleet**	***Expected First Year of Operation**	***Quantification Period (yrs)**	***Quantification Period II (yrs)**	***Annual Miles Traveled (mi/yr)**	**Replacement Vehicle Odometer Reading (for Used Trucks)**	***Annual Average hours of operation (hrs/yr)**	***Type of Off-Road Project**
Ag Trade-Up #1	1			2018	10				1000	Replacement
Ag Trade-Up #2	2			2018	3				300	Replacement

Figure 11: Screenshot of information for Ag Trade-Up Baseline Vehicles/Equipment – Quantification Inputs Tab

Baseline Vehicle/Equipment														
*Engine Model Year	Vehicle Model Year	*Fuel Type	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)	*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Does equipment/vehicle have other installed emissions control systems? Select from drop down	*Engine cycle type
2010	2010	Diesel	1111	2222	Test	10		Agricultural Tractors			200	3		
2000	2000	Diesel	5555	6666	Test	5		Agricultural Tractors			175	0		

Figure 12: Screenshot of information for Ag Trade-up Replacement Vehicle/Equipment – Quantification Inputs Tab

Replacement Vehicle/Equipment													
*Engine Model Year	Vehicle Model Year	*Fuel Type	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)	*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Does equipment/vehicle have other installed emissions control systems? Select from drop down
2017	2017	Diesel	3333	4444	Test	10					250	4_Final	
2010	2010	Diesel	1111	2222	Test	10					200	3	

Funding Inputs in the "Funding Inputs-Incentive Calcs" Tab

Information on the "Project Type" and "District Supplied Project ID" will auto-populate based upon inputs in the "Project Profile" tab. Criteria Pollutants, GHG Cost-Effectiveness, and Maximum Eligible Incentive Amount values will also be calculated and auto-populate based on the project Quantification Inputs. It should be noted that the User Defined Incentive Amount cannot exceed the Maximum Eligible Incentive Amount.

Farmer #1 buying a new Tier 4 Final tractor to replace his/her Tier 3 tractor:

Table 7: Ag Trade-Up Transaction #1 – Funding Inputs and Incentives Calcs

Ag Trade-Up #1	
FARMER Benefits Calculator Tool Headings: "Funding Inputs-Incentive Calcs" Tab	**User-Defined Inputs**
New Vehicle/Equipment Cost ($)	100,000
Funding Source #1 – Source	GGRF (FARMER)
Funding Source #1 – Amount ($)	50,000
FARMER allocation Fiscal Year	FY 2017-2018
Funding Source #2 – Source	AQIF (FARMER)
Funding Source #2 – Amount ($)	25,000
FARMER allocation Fiscal Year	FY 2017-2018
User defined cost-effectiveness limit ($/ton)[13]	
User Defined Incentive Amount ($)	

[13] Optional input

Farmer #2 receiving the Tier 3 tractor from Farmer #1 after it has been reconditioned enabling him/her to scrap his/her Tier 0 tractor:

Table 8: Ag Trade-Up Transaction #2 – Funding Inputs and Incentives Calcs

Ag Trade-Up #2	
FARMER Benefits Calculator Tool Headings: "Funding Inputs-Incentive Calcs" Tab	**User-Defined Inputs**
New Vehicle/Equipment Cost ($)[14]	8,000
Funding Source #1 – Source	GGRF (FARMER)
Funding Source #1 – Amount ($)	7,000
FARMER allocation Fiscal Year	FY 2017-2018
Funding Source #2 – Source	
Funding Source #2 – Amount ($)	
FARMER allocation Fiscal Year	
User defined cost-effectiveness limit ($/ton)[15]	
User Defined Incentive Amount ($)	7,000

[14] The new vehicle/equipment cost for Trade-Up #2 should include the total costs for transportation, assessment, and repair of the equipment from Trade-Up #1
[15] Optional input

Figure 13-Figure 14 shows how the inputs from Table 7-Table 8 are inputted into the tool.

Figure 13: Screenshots of Funding Inputs and Incentive Calculations tab

Project Type	District Supplied Project ID	*New Vehicle/Equipment Cost ($)	Funding Source #1			Funding Source #2		
			*Source	Amount ($)	FARMER allocation Fiscal Year	Source	Amount ($)	FARMER allocation Fiscal Year
Ag Trade-Up #1	1	100,000.00	GGRF (FARMER)	50,000.00	FY 2017-2018	AQIF (FARMER)	25,000.00	FY 2017-2018
Ag Trade-Up #2	2	8,000.00	GGRF (FARMER)	7,000.00	FY 2017-2018			

Figure 14: Screenshots of Funding Inputs and Incentive Calculations tab (cont.)

Max allowable incentive amount ($)	Cost-effectiveness at max incentive ($/ton)	Incentive amount based on user defined cost-effectiveness ($)	User defined cost-effectiveness limit ($/ton)	User defined incentive amount ($)	Cost-effectiveness based on user defined incentive amount ($/ton)	GHG Cost-Effectiveness (MTCO2e/$)
80,000.00	10,631.27	-			10,631.27	-
		-		7,000.00	5,384.81	0.00

Step 3: Estimate GHG Emission Reductions and Selected Co-benefits for the Proposed Project Using the FARMER Benefits Calculator Tool

As shown in Figure 15, the GHG & Co-Ben Aggregate tab displays GHG reductions (or an increase) and Co-Benefit reductions for each of the 8 project types aggregated.

Figure 15: Screenshots of results shown in GHG and Co-Ben Aggregate Tab

GHG Reductions, Criteria Pollutants, and Co-Benefits Aggregated by Project Type

Project Type	GHG Reductions (MTCO2e)	PM2.5 Reductions		NOx Reductions		Reactive Organic Gas Reductions		Diesel PM (PM10) Reductions		Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings ($)	Fossil Fuel Energy Use Reductions (kWh)
		(tpy)	(lbs)	(tpy)	(lbs)	(tpy)	(lbs)	(tpy)	(lbs)				
Moyer On-Road Heavy-Duty Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-
FARMER On-Road Heavy-Duty Trucks (new/used)	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Road Agricultural Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-
Irrigation Pump Engines	-	-	-	-	-	-	-	-	-	-	-	-	-
ZEV_Ag_UTV	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Road Ag Equipment: 2 (or more)-for-1	-	-	-	-	-	-	-	-	-	-	-	-	-
Irrigation Pump Engines: 2 (or more)-for-1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ag Trade-Up #1	-	0.02	369.35	0.36	7,199.07	0.04	724.54	0.02	401.47	-	-	-	-
Ag Trade-Up #2	1.85	0.01	53.64	0.23	1,379.55	0.02	106.25	0.01	58.31	1.90	-	482.19	-

The **GHG Summary tab** displays GHG reductions (or an increase) for each line item project. It also prorates the emissions by funding source as shown in Figure 16.

Figure 16: Screenshot of results shown in GHG Summary Tab

By project line item:		GHG Calculations (Quantification Period)											
		Not Prorated	FARMER GGRF*	GGRF Prorated	AQIF Prorated	ARFVTF Prorated	Tire Fund	GGRF (other) Prorated	GGRF (interest) Prorated	AQIP (interest) Prorated	ARFVTF (interest) Prorated	Tire Fund (interest)	Local Funding Sources Prorated
Project Type	District Supplied Project ID	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)
Ag Trade-Up #1	1	-	-	-	-	-	-	-	-	-	-	-	-
Ag Trade-Up #2	2	1.85	1.85	1.85	-	-	-	-	-	-	-	-	-

The **Co-Benefits Summary** tab displays changes in criteria pollutants, co-benefits, and key variables. Similar to the **GHG Summary** tab, prorated values for the aforementioned criteria pollutants, co-benefits, and key variables are also calculated as shown in Figure 17-Figure 18.

Figure 17: Screenshot of results shown Co-Benefits Summary Tab

		Total							
Project Type	**District Supplied Project ID**	**Fuel Reduction (Gallons)**	**Fuel Reduction (scf)**	**Fuel savings ($)**	**Fossil Fuel Energy Use Reductions (kWh)**	**$PM_{2.5}$ Reductions (tpy)**	**NOx Reductions (tpy)**	**Reactive Organic Gas Reductions (tpy)**	**Diesel PM (PM10) Reductions (tpy)**
Ag Trade-Up #1	1	-	-	-	-	0.02	0.36	0.04	0.02
Ag Trade-Up #2	2	1.90	-	482.19	-	0.01	0.23	0.02	0.01

Figure 18: Screenshot of results shown Co-Benefits Summary Tab (cont.)

FARMER GGRF*								GGRF (other) Prorated							
Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings ($)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)	Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings ($)	Fossil Fuel Energy Use Reductions (kWh)	PM2.5 Reductions (tpy)	NOx Reductions (tpy)	Reactive Organic Gas Reductions (tpy)	Diesel PM (PM10) Reductions (tpy)
-	-	-	-	0.02	0.36	0.04	0.02	0	0	0	0	0	0	0	0
1.90	-	482.19	-	0.01	0.23	0.02	0.01	0	0	0	0	0	0	0	0

Administrative Step: Fiscal Reporting

Based on the dates entered in the “Project Profile” tab and on the funding amounts entered in the “Funding Inputs-Incentive Calcs” tab, users can track their fiscal spending based on funding source and fiscal year within a given quarter. Note: for the “Fiscal Reporting Summary” tab to work properly, air districts must fill out the required input fields as well as specify the applicable quarterly reporting period in the “Air District Info” tab

Figure 19: Screenshot of Fiscal Reporting Summary tab

Funding Source	Fiscal Year	Share of Project Implementation Funding (%)	Total Project Funding	Total Project Implementation Funding	Total Funding Allocation	Total Interest and Revenue Earned ($)	Total project funding under contracts	Percent project funding under contract or obligated	Remaining project funding available	Total project funding expended or liquidated	Percent project funding expended or liquidated	Project funding available for expenditure/liquidation
GGRF	FY 2017-2018				$ -		$ 57,000.00		$ (57,000.00)	$ 57,000.00		$ (57,000.00)
AQIF	FY 2017-2018				$ -		$ 25,000.00		$ (25,000.00)	$ 25,000.00		$ (25,000.00)

Figure 20: Screenshot of Fiscal Reporting Summary tab (cont.)

	Project implementation funds expended during reporting period	Total project implementation funds expended through reporting period	Percent project implementation funding expended	Remaining balance of project implementation funds
				$ -
				$ -

Example Project II

Overview of the proposed project

The proposed project is a 2 (or more)-for-1 involving off-road agricultural equipment:

- The applicant will be scrapping two combines and will be purchasing a single newer combine with a max rated horsepower rating higher than any of the two combines that are being scrapped.

The proposed project is located in San Joaquin County with the following project characteristics:

- The applicant primarily operates his/her tractor within a community that is characterized as disadvantaged and low-income.

Methods to apply

Step 1: Define the Project

Define the Project in the "Project Profile" Tab

Table 9: Off-Road Agricultural Equipment: 2 (or more)-for-1

Off-Road Ag Equipment: 2 (or more)-for-1	
FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	**User-Defined Inputs**
Project Type	Off-Road Ag Equipment: 2 (or more)-for-1
District Supplied Project ID	112233
# of Baseline Equipment/Vehicle(s) being scrapped for 2-for-1	2
Mailing Address: Street Name	123 ABC Road
Mailing Address: City	Fresno
Mailing Address: State	CA
Mailing Address: Zip Code	98765
Vehicle/Equipment Latitude (degrees)	37.726039
Vehicle/Equipment Longitude (degrees)	-121.229604
Vehicle/Equipment Census Tract(s)	6077005106
Carl Moyer Guidelines Version	2017
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Project Located Within Disadvantaged Community?	Yes
Project Located Within Low-income Community or Low-income Household?	Yes
Project Located Within 1/2-mile Low-income Buffer Region?	No
Community Need Addressed	D (Refer to the list of common needs for priority populations in CARB's Funding Guidelines Table 5 and confirm that the project addresses at least one listed need.)
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.
Benefit Criteria Met	A (Project provides incentives for vehicles, equipment, or renewable transportation fuel that reduce criteria air pollutant or toxic air contaminant emissions, such as diesel particulate matter)
Written description of the benefits to priority populations	This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.
Average Annual Use During Project Life: Numerical Value	250
Average Annual Use During Project Life: Units	Hours

Figure 21-Figure 24 shows how the project profile information from Table 9 is inputted into the tool. The tool is designed such that if the user selects a 2 (or more)-for-1 project type, he/she is prompted to input the number of baseline equipment he/she will be scrapping. This quantity then determines the number of subsequent rows in the various tool tabs that will be reserved for this single project.

Figure 21: Screenshot of Project Profile Tab –Location Information

*Project Type	*District Supplied Project ID (must be filled out for proper calculations)	*# of Baseline Equipment/Vehicle being traded in for 2-for-1	Mailing Address: Street Number and Name	Mailing Address: City	Mailing Address: State	Mailing Address: Zip Code	Vehicle/Equipment Latitude (degrees)	Vehicle/Equipment Longitude (degrees)
Off-Road Ag Equipment: 2 (or more)-for-1	112233	2	123 ABC Road	Fresno	CA	98765		
Off-Road Ag Equipment: 2 (or more)-for-1								

Figure 22: Screenshot of Profile Tab -- Dates

Carl Moyer Guidelines Version	Contract Execution Date	Post-Inspection Date	Date of Payment
2017	1/1/2019	2/1/2019	3/1/2019

Figure 23: Screenshot of Project Profile Tab – Columns regarding benefits to Priority Populations

Project Located Within:			Community Need Addressed	**Written description of the identified community or household need	Benefit Criteria Met	**Written description of the benefits to priority populations	**Written description of any Project Co-benefits
Disadvantaged Community?	Low-income Community or Low-income Household?	1/2-mile Low-income Buffer Region?					
Yes	Yes	No	D	This is an example of a written description: Air District held several community meetings and received letters of support for funding tractor replacements. The communities covered by the program are heavily impacted by poor air quality.	A	This is an example of a written description: Incentives for tractor replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.	This is an example of a written description: brand new GPS technology in newer equipment reduces row overlap.

Figure 24[16] shows two new columns that were added to the Project Profile tab. These columns provide a space for users to track and report on the average annual usage (in miles, hrs, or kWh within a given year).

Figure 24: Tracking and Reporting of Average Annual Use During Project Life within the Project Profile tab

Average Annual Use During Project Life:	
Numerical Value	**Units**
250	hours

Step 2: Determine the FARMER Benefits Calculator Tool Inputs Needed

Inputs for the Baseline and Replacement Equipment/Vehicles in the "Quantification Inputs" Tab

Information on the "Project Type" and "District Supplied Project ID" will auto-populate based upon inputs in the "Project Profile" tab.

[16] Tracking and reporting of Average Annual Use During Project Life reflects a new modification to this latest version of the FARMER Benefits Calculator tool.

Table 10: First row inputs for 2 (or more)-for-1 Off-Road project. User puts inputs for first baseline vehicle and the replacement vehicle

Off-Road Ag Equipment: 2 (or more)-for-1		
FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	**FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab**	**User-Defined Inputs**
Basic Information	**Is project eligible for Carl Moyer 2-Step Calculation?**	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2019
	Quantification Period (yrs)	10
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	500
	Type of Off-Road Project	Replacement
Baseline Vehicle/Equipment	**Engine Model Year**	1992
	Vehicle Model Year	1992
	Fuel Type	Diesel
	Vehicle Serial Number	1111
	Engine Serial Number	2222
	Engine Family Name	Test
	Engine Displacement (liters)	7.6
	Engine Standard	Not Applicable
	Equipment Type	Combines/Choppers
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	260
	Tier	0
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable
	Engine cycle type	Not Applicable
Replacement Vehicle/Equipment	**Engine Model Year**	2019
	Vehicle Model Year	2019
	Fuel Type	Diesel
	Vehicle Serial Number	7777
	Engine Serial Number	8888
	Engine Family Name	Test
	Engine Displacement (liters)	12.9
	Engine Standard	Not Applicable
	Equipment Type	Combines/Choppers
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	480
	Tier	4_Final
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable

Table 11: Second row inputs for 2 (or more)-for-1 Off-Road project. User puts inputs for second baseline vehicle while the inputs for the replacement vehicle are not used.

Off-Road Ag Equipment: 2 (or more)-for-1		
FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	**FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab**	**User-Defined Inputs**
Basic Information	**Is project eligible for Carl Moyer 2-Step Calculation?**	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	Not Applicable
	Quantification Period (yrs)	Not Applicable
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	500
	Type of Off-Road Project	Not Applicable
Baseline Vehicle/Equipment	**Engine Model Year**	1992
	Vehicle Model Year	1992
	Fuel Type	Diesel
	Vehicle Serial Number	3333
	Engine Serial Number	4444
	Engine Family Name	Test
	Engine Displacement (liters)	7.6
	Engine Standard	Not Applicable
	Equipment Type	Combines/Choppers
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	260
	Tier	0
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable
	Engine cycle type	Not Applicable
Replacement Vehicle/Equipment	**Engine Model Year**	Not Applicable
	Vehicle Model Year	Not Applicable
	Fuel Type	Not Applicable
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	Not Applicable
	Engine Family Name	Not Applicable
	Engine Displacement (liters)	Not Applicable
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	Not Applicable
	Tier	Not Applicable
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable

Figure 25-Figure 27 shows how the inputs in Table 10-Table 11 are inputted into the tool. It is noteworthy to point out that all rows are used to ascertain the parameters pertaining the 2 baselines (along with their usage – i.e., Annual Average hours of operation). However, only the first row is needed to capture the inputs for the single replacement equipment.

Figure 25: Screenshot of basic information – Quantification Inputs Tab

Basic Information										
Project Type	**District Supplied Project ID**	***Is project eligible for Carl Moyer 2-Step Calculation?**	***Number of vehicles in Fleet**	***Expected First Year of Operation**	***Quantification Period (yrs)**	***Quantification Period II (yrs)**	***Annual Miles Traveled (mi/yr)**	**Replacement Vehicle Odometer Reading (for Used Trucks)**	***Annual Average hours of operation (hrs/yr)**	***Type of Off-Road Project**
Off-Road Ag Equipment: 2 (or more)-for-1	112233			2019	10				500	Replacement
Off-Road Ag Equipment: 2 (or more)-for-1									500	

Figure 26: Screenshot of inputs for 2 baseline equipment being scrapped for 1 replacement

Baseline Vehicle/Equipment														
*Engine Model Year	Vehicle Model Year	*Fuel Type	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)	*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Does equipment/vehicle have other installed emissions control systems? Select from drop down	*Engine cycle type
1992	1992	Diesel	1111	2222	Test	7.6		Combines/ Choppers			260	0		
1992	1992	Diesel	3333	4444	Test	7.6		Combines/ Choppers			260	0		

Figure 27: Screenshot of inputs for replacement equipment

Replacement Vehicle/Equipment													
*Engine Model Year	Vehicle Model Year	*Fuel Type	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)	*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Does equipment/vehicle have other installed emissions control systems? Select from drop down
2019	2019	Diesel	7777	8888	Test	12.9		Combines/Choppers			480	4_Final	

Funding Inputs in the “Funding Inputs-Incentive Calcs” Tab

Information on the “Project Type” and “District Supplied Project ID” will auto-populate based upon inputs in the “Project Profile” tab. Criteria Pollutants, GHG Cost-Effectiveness, and Maximum Eligible Incentive Amount values will also be calculated and auto-populate based on the project Quantification Inputs. It should be noted that the User Defined Incentive Amount cannot exceed the Maximum Eligible Incentive Amount.

Table 12: Funding Inputs and Incentives Calcs

Off-Road Ag Equipment: 2 (or more)-for-1	
FARMER Benefits Calculator Tool Headings: “Funding Inputs-Incentive Calcs” Tab	**User-Defined Inputs**
New Vehicle/Equipment ($)	570,000
Funding Source #1 – Source	GGRF (FARMER)
Funding Source #1 – Amount ($)	456,000
FARMER allocation Fiscal Year	FY 2017-2018
Funding Source #2 – Source	
Funding Source #2 – Amount ($)	
FARMER allocation Fiscal Year	
User Defined Cost-Effectiveness Limit ($/ton)	
User Defined Incentive Amount ($)	

Figure 28-Figure 29 show how the inputs from Table 12 are inputted into the tool.

Figure 28: Screenshots of Funding Inputs and Incentive Calculations tab

Project Type	District Supplied Project ID	*New Vehicle/Equipment Cost ($)	Funding Source #1			Funding Source #2		
			*Source	Amount ($)	FARMER allocation Fiscal Year	Source	Amount ($)	FARMER allocation Fiscal Year
Off-Road Ag Equipment: 2 (or more)-for-1	112233	570,000.00	GGRF (FARMER)	456,000.00	FY 2017-2018			
Off-Road Ag Equipment: 2 (or more)-for-1								

Figure 29: Screenshots of Funding Inputs and Incentive Calculations tab (cont.)

Max allowable incentive amount ($)	Cost-effectiveness at max incentive ($/ton)	Incentive amount based on user defined cost-effectiveness ($)	User defined cost-effectiveness limit ($/ton)	User defined incentive amount ($)	Cost-effectiveness based on user defined incentive amount ($/ton)	GHG Cost-Effectiveness (MTCO2e/$)
456,000.00	12,113.91	-			12,113.91	0.00

Step 3: Estimate GHG Emission Reductions and Selected Co-benefits for the Proposed Project Using the FARMER Benefits Calculator Tool

As shown in Figure 30, the GHG & Co-Ben Aggregate tab displays GHG reductions (or an increase) and Co-Benefit reductions (or an increase) for each of the 8 project types aggregated.

Figure 30: Screenshots of results shown in GHG and Co-Ben Aggregate Tab

GHG Reductions, Criteria Pollutants, and Co-Benefits Aggregated by Project Type

Project Type	GHG Reductions (MTCO2e)	PM2.5 Reductions		NOx Reductions		Reactive Organic Gas Reductions		Diesel PM (PM10) Reductions		Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings ($)	Fossil Fuel Energy Use Reductions (kWh)
		(tpy)	(lbs)	(tpy)	(lbs)	(tpy)	(lbs)	(tpy)	(lbs)				
Moyer On-Road Heavy-Duty Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-
FARMER On-Road Heavy-Duty Trucks (new/used)	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Road Agricultural Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-
Irrigation Pump Engines	-	-	-	-	-	-	-	-	-	-	-	-	-
ZEV_Ag_UTV	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Road Ag Equipment: 2 (or more)-for-1	59.83	0.09	1,821.37	1.86	37,101.23	0.16	3,106.17	0.10	1,979.75	4,429.40	-	15,635.78	-
Irrigation Pump Engines: 2 (or more)-for-1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ag Trade-Up #1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ag Trade-Up #2	-	-	-	-	-	-	-	-	-	-	-	-	-

The **GHG Summary tab** displays GHG reductions (or an increase) for each line item project. It also prorates the emissions by funding source as shown in Figure 31.

Figure 31: Screenshot of results shown in GHG Summary Tab

By project line item:		GHG Calculations (Quantification Period)											
		Not Prorated	FARMER GGRF	GGRF Prorated	AQIF Prorated	ARFVTF Prorated	Tire Fund	GGRF (other) Prorated	GGRF (interest) Prorated	AQIP (interest) Prorated	ARFVTF (interest) Prorated	Tire Fund (interest)	Local Funding Sources Prorated
Project Type	**District Supplied Project ID**	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)
Off-Road Ag Equipment: 2 (or more)-for-1	112233	59.83	59.83	59.83									
Off-Road Ag Equipment: 2 (or more)-for-1													

The **Co-Benefits Summary** tab displays reductions (or an increase) for criteria pollutants, co-benefits, and key variables. Similar to the **GHG Summary** tab, prorated values for the aforementioned criteria pollutants, co-benefits, and key variables are also calculated as shown in Figure 32-Figure 33.

Figure 32: Screenshot of results shown in Co-Benefits Summary Tab

		Total							
Project Type	**District Supplied Project ID**	**Fuel Reduction (Gallons)**	**Fuel Reduction (scf)**	**Fuel savings ($)**	**Fossil Fuel Energy Use Reductions (kWh)**	**$PM_{2.5}$ Reductions (tpy)**	**NOx Reductions (tpy)**	**Reactive Organic Gas Reductions (tpy)**	**Diesel PM (PM10) Reductions (tpy)**
Off-Road Ag Equipment: 2 (or more)-for-1	1	4,429.40	-	15,635.78	-	0.09	1.86	0.16	0.10
Off-Road Ag Equipment: 2 (or more)-for-1									

Figure 33: Screenshot of results shown in Co-Benefits Summary Tab (cont.)

FARMER GGRF*								GGRF (other) Prorated							
Fuel Reduction (Gallons)	**Fuel Reduction (scf)**	**Fuel savings ($)**	**Fossil Fuel Energy Use Reductions (kWh)**	**PM2.5 Reductions (tpy)**	**NOx Reductions (tpy)**	**Reactive Organic Gas Reductions (tpy)**	**Diesel PM (PM10) Reductions (tpy)**	**Fuel Reduction (Gallons)**	**Fuel Reduction (scf)**	**Fuel savings ($)**	**Fossil Fuel Energy Use Reductions (kWh)**	**PM2.5 Reductions (tpy)**	**NOx Reductions (tpy)**	**Reactive Organic Gas Reductions (tpy)**	**Diesel PM (PM10) Reductions (tpy)**
4,429.40	-	15,635.78	-	0.09	1.86	0.16	0.10	0	0	0	0	0	0	0	0

Administrative Step: Fiscal Reporting

Based on the dates entered in the “Project Profile” tab and on the funding amounts entered in the “Funding Inputs-Incentive Calcs” tab, users can track their fiscal spending based on funding source and fiscal year within a given quarter. Note: for the “Fiscal Reporting Summary” tab to work properly, air districts must fill out the required input fields as well as specify the applicable quarterly reporting period in the “Air District Info” tab.

Figure 34: Screenshot of Fiscal Reporting Summary tab

Funding Source	Fiscal Year	Share of Project Implementation Funding (%)	Total Project Funding	Total Project Implementation Funding	Total Funding Allocation	Total Interest and Revenue Earned ($)	Total project funding under contracts	Percent project funding under contract or obligated	Remaining project funding available	Total project funding expended or liquidated	Percent project funding expended or liquidated	Project funding available for expenditure/liquidation
GGRF	FY 2017-2018				$ -		$ 456,000.00		$ (456,000.00)	$ 456,000.00		$ (456,000.00)

Figure 35: Screenshot of Fiscal Reporting Summary tab (cont.)

Project implementation funds expended during reporting period	Total project implementation funds expended through reporting period	Percent project implementation funding expended	Remaining balance of project implementation funds
			$ -

Example Project III

Overview of the proposed project

The proposed project is an Irrigation Pump Engine project with the following features:

- The applicant will be scrapping a Tier 0, diesel pump and replacing it with a Tier 3 version.
- The applicant is also installing new infrastructure in the form of power lines to support the pumps.
- The pumps and power lines occur at the same location.

The proposed project is located in San Joaquin County with the following project characteristics:

- The applicant primarily operates his/her tractor within a community that is characterized as disadvantaged.

Methods to apply

Step 1: Define the Project

Define the Project in the "Project Profile" Tab

Table 13: Irrigation Pump Engines

Irrigation Pump Engines	
FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	**User-Defined Inputs**
Project Type	Irrigation Pumps Engines
District Supplied Project ID	13579
# of Baseline Equipment/Vehicle being scrapped for 2-for-1	Not Applicable
Mailing Address: Street Name	123 ABC Road
Mailing Address: City	TestCity
Mailing Address: State	CA
Mailing Address: Zip Code	98765
Vehicle/Equipment Latitude (degrees)	37.726039
Vehicle/Equipment Longitude (degrees)	-121.229604
Carl Moyer Guidelines Version	2017
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Project Located Within Disadvantaged Community?	Yes
Project Located Within Low-income Community or Low-income Household?	No
Project Located Within 1/2-mile Low-income Buffer Region?	No
Community Need Addressed	D (Refer to the list of common needs for priority populations in CARB's Funding Guidelines Table 5 and confirm that the project addresses at least one listed need.)
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding irrigation pump replacements. The communities covered by the program are heavily impacted by poor air quality.
Benefit Criteria Met	A (Project provides incentives for vehicles, equipment, or renewable transportation fuel that reduce criteria air pollutant or toxic air contaminant emissions, such as diesel particulate matter)
Written description of the benefits to priority populations	This is an example of a written description: Incentives for irrigation pump replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: Newer pumps reduce maintenance costs.
Average Annual Use During Project Life: Numerical Value	3000
Average Annual Use During Project Life: Units	hours

Table 14: Infrastructure Corresponding to Irrigation Pump Engine

Irrigation Pump Engines	
FARMER Benefits Calculator Tool Headings: "Project Profile" Tab	**User-Defined Inputs**
Project Type	Irrigation Pumps Engines
District Supplied Project ID	Not Applicable
# of Baseline Equipment/Vehicle being scrapped for 2-for-1	Not Applicable
Mailing Address: Street Name	123 ABC Road
Mailing Address: City	TestCity
Mailing Address: State	CA
Mailing Address: Zip Code	98765
Vehicle/Equipment Latitude (degrees)	37.726039
Vehicle/Equipment Longitude (degrees)	-121.229604
Carl Moyer Guidelines Version	2017
Contract Execution Date	1/1/19
Post-Inspection Date	2/1/19
Date of Payment	3/1/19
Project Located Within Disadvantaged Community?	Yes
Project Located Within Low-income Community or Low-income Household?	No
Project Located Within 1/2-mile Low-income Buffer Region?	No
Community Need Addressed	D (Refer to the list of common needs for priority populations in CARB's Funding Guidelines Table 5 and confirm that the project addresses at least one listed need.)
Written description of the identified community or household need	This is an example of a written description: Air District held several community meetings and received letters of support for funding irrigation pump replacements. The communities covered by the program are heavily impacted by poor air quality.
Benefit Criteria Met	A (Project provides incentives for vehicles, equipment, or renewable transportation fuel that reduce criteria air pollutant or toxic air contaminant emissions, such as diesel particulate matter)
Written description of the benefits to priority populations	This is an example of a written description: Incentives for irrigation pump replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.
Written description of any project co-benefits	This is an example of a written description: Newer pumps reduce maintenance costs.
Average Annual Use During Project Life: Numerical Value	3000
Average Annual Use During Project Life: Units	hours

Figure 36-Figure 39 shows how the project profile information from Table 13-Table 14 is inputted into the tool.

Figure 36: Screenshot of Project Profile Tab –Location Information

*Project Type	*District Supplied Project ID (must be filled out for proper calculations)	*# of Baseline Equipment/Vehicle being traded in for 2-for-1	Mailing Address: Street Number and Name	Mailing Address: City	Mailing Address: State	Mailing Address: Zip Code	Vehicle/Equipment Latitude (degrees)	Vehicle/Equipment Longitude (degrees)
Irrigation Pump Engines	13579		123 ABC Road	TestCity	CA	98765	37.726039	-121.229604
Infrastructure (tied to project directly above)			123 ABC Road	TestCity	CA	98765	37.726039	-121.229604

Figure 37: Screenshot of Project Profile Tab -- Dates

Carl Moyer Guidelines Version	Contract Execution Date	Post-Inspection Date	Date of Payment
2017	1/1/2019	2/1/2019	3/1/2019
2017	1/1/2019	2/1/2019	3/1/2019

Figure 38: Screenshot of Project Profile Tab – Columns regarding benefits to Priority Populations

Project Located Within:			Community Need Addressed	**Written description of the identified community or household need	Benefit Criteria Met	**Written description of the benefits to priority populations	**Written description of any Project Co-benefits
Disadvantaged Community?	Low-income Community or Low-income Household?	1/2-mile Low-income Buffer Region?					
Yes	No	No	D	This is an example of a written description: Air District held several community meetings and received letters of support for funding irrigation pump replacements. The communities covered by the program are heavily impacted by poor air quality.	A	This is an example of a written description: Incentives for irrigation pump replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.	This is an example of a written description: Newer pumps reduce maintenance costs.
Yes	No	No	D	This is an example of a written description: Air District held several community meetings and received letters of support for funding irrigation pump replacements. The communities covered by the program are heavily impacted by poor air quality.	A	This is an example of a written description: Incentives for irrigation pump replacements make it easier for farmers to receive newer equipment. This more reliable equipment reduces maintenance costs to farmers and increases farm productivity. Moreover, the cleaner equipment will reduce greenhouse gas and criteria pollutant emissions.	This is an example of a written description: Newer pumps reduce maintenance costs.

Figure 39: Tracking and Reporting of Average Annual Use During Project Life within the Project Profile tab

Average Annual Use During Project Life:	
Numerical Value	**Units**
3000	hours
3000	hours

Step 2: Determine the FARMER Benefits Calculator Tool Inputs Needed

Inputs for the Baseline and Replacement Equipment/Vehicles in the "Quantification Inputs" Tab

Information on the "Project Type" and "District Supplied Project ID" will auto-populate based upon inputs in the "Project Profile" tab.

Table 15: First row inputs for Irrigation Pump Engines project.

Irrigation Pump Engines		
FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	**FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab**	**User-Defined Inputs**
Basic Information	**Is project eligible for Carl Moyer 2-Step Calculation?**	No
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2018
	Quantification Period (yrs)	10
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	500
	Type of Off-Road Project	Repower
Baseline Vehicle/Equipment	**Engine Model Year**	2000
	Vehicle Model Year	Not Applicable
	Fuel Type	Diesel
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	1111
	Engine Family Name	Test
	Engine Displacement (liters)	10
	Engine Standard	Not Applicable
	Equipment Type	Irrigation Pump
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	100
	Tier	0
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable
	Engine cycle type	Not Applicable
Replacement Vehicle/Equipment	**Engine Model Year**	2019
	Vehicle Model Year	Not Applicable
	Fuel Type	Electric
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	2222
	Engine Family Name	Test
	Engine Displacement (liters)	10
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	Not Applicable
	Tier	Not Applicable
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable

Table 16: Second row inputs for infrastructure related to Irrigation Pump Engines project.

Infrastructure		
FARMER Benefits Calculator Tool Headings: "Quantification Inputs" Tab	**FARMER Benefits Calculator Tool Subheadings: "Quantification Inputs" Tab**	**User-Defined Inputs**
Basic Information	**Is project eligible for Carl Moyer 2-Step Calculation?**	Not Applicable
	Number of vehicles in Fleet	Not Applicable
	Expected First Year of Operation	2018
	Quantification Period (yrs)	10
	Quantification Period II (yrs)	Not Applicable
	Annual Miles Traveled (mi/yr)	Not Applicable
	Annual Average hours of operation (hrs/yr)	Not Applicable
	Type of Off-Road Project	All Projects
Baseline Vehicle/Equipment	**Engine Model Year**	Not Applicable
	Vehicle Model Year	Not Applicable
	Fuel Type	Not Applicable
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	Not Applicable
	Engine Family Name	Not Applicable
	Engine Displacement (liters)	Not Applicable
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	Not Applicable
	Tier	Not Applicable
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable
	Engine cycle type	Not Applicable
Replacement Vehicle/Equipment	**Engine Model Year**	Not Applicable
	Vehicle Model Year	Not Applicable
	Fuel Type	Not Applicable
	Vehicle Serial Number	Not Applicable
	Engine Serial Number	Not Applicable
	Engine Family Name	Not Applicable
	Engine Displacement (liters)	Not Applicable
	Engine Standard	Not Applicable
	Equipment Type	Not Applicable
	Gross Vehicle Weight Rating	Not Applicable
	Intended Service Class	Not Applicable
	Horsepower	Not Applicable
	Tier	Not Applicable
	Does equipment/vehicle have other installed emissions control systems? Select from drop down	Not Applicable

Figure 40-Figure 42 shows how the inputs in Table 15-Table 16 are inputted into the tool.

Figure 40: Screenshot of basic information – Quantification Inputs Tab

Basic Information										
Project Type	**District Supplied Project ID**	***Is project eligible for Carl Moyer 2-Step Calculation?**	***Number of vehicles in Fleet**	***Expected First Year of Operation**	***Quantification Period (yrs)**	***Quantification Period II (yrs)**	***Annual Miles Traveled (mi/yr)**	**Replacement Vehicle Odometer Reading (for Used Trucks)**	***Annual Average hours of operation (hrs/yr)**	***Type of Off-Road Project**
Irrigation Pump Engines	13579	No		2018	10				500	Repower
Infrastructure (tied to project directly above)	13579-i			2018	10					All Projects

Figure 41: Screenshot of inputs for baseline irrigation pump

Baseline Vehicle/Equipment														
*Engine Model Year	Vehicle Model Year	*Fuel Type	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)	*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Intended Service Class	*Horsepower	*Tier	*Does equipment/vehicle have other installed emissions control systems? Select from drop down	*Engine cycle type
2000		Diesel		1111	Test	10		Irrigation Pump			100	0		

Figure 42: Screenshot of inputs for replacement irrigation pump

Replacement Vehicle/Equipment												
*Engine Model Year	Vehicle Model Year	*Fuel Type	Vehicle Serial Number	Engine Serial Number	Engine Family Name	Engine Displacement (liters)	*Engine Standard	*Equipment Type	*Gross Vehicle Weight Rating	*Horsepower	*Tier	*Does equipment/vehicle have other installed emissions control systems? Select from drop down
2019		Electric		2222	Test	10						

Funding Inputs in the “Funding Inputs-Incentive Calcs” Tab

Information on the “Project Type” and “District Supplied Project ID” will auto-populate based upon inputs in the “Project Profile” tab. Criteria Pollutants, GHG Cost-Effectiveness, and Maximum Eligible Incentive Amount values will also be calculated and auto-populate based on the project Quantification Inputs. It should be noted that the User Defined Incentive Amount cannot exceed the Maximum Eligible Incentive Amount.

Table 17: Funding Inputs and Incentives Calcs

Irrigation Pump Engines	
FARMER Benefits Calculator Tool Headings: “Funding Inputs-Incentive Calcs” Tab	**User-Defined Inputs**
New Vehicle/Equipment ($)	35,000
Funding Source #1 – Source	GGRF (FARMER)
Funding Source #1 – Amount ($)	28,000
FARMER allocation Fiscal Year	FY 2017-2018
Funding Source #2 – Source	
Funding Source #2 – Amount ($)	
FARMER allocation Fiscal Year	
User Defined Cost-Effectiveness Limit ($/ton)	
User Defined Incentive Amount ($)	28,000

Table 18: Funding Inputs and Incentives Calcs

Infrastructure	
FARMER Benefits Calculator Tool Headings: “Funding Inputs-Incentive Calcs” Tab	**User-Defined Inputs**
New Vehicle/Equipment ($)	8,000
Funding Source #1 – Source	GGRF (FARMER)
Funding Source #1 – Amount ($)	4,000
FARMER allocation Fiscal Year	FY 2017-2018
Funding Source #2 – Source	
Funding Source #2 – Amount ($)	
FARMER allocation Fiscal Year	
User Defined Cost-Effectiveness Limit ($/ton)	
User Defined Incentive Amount ($)	4,000

Figure 43-Figure 44 show how the inputs from Table 17-Table 18 are inputted into the tool.

Figure 43: Screenshots of Funding Inputs and Incentive Calculations tab

Project Type	District Supplied Project ID	*New Vehicle/Equipment Cost ($)	Funding Source #1			Funding Source #2		
			*Source	Amount ($)	FARMER allocation Fiscal Year	Source	Amount ($)	FARMER allocation Fiscal Year
Irrigation Pump Engines	13579	35,000.00	GGRF (FARMER)	28,000.00	FY 2017-2018			
Infrastructure (tied to project directly above)	13579-i	8,000.00	GGRF (FARMER)	4,000.00	FY 2017-2018			

Figure 44: Screenshots of Funding Inputs and Incentive Calculations tab

Max allowable incentive amount ($)	Cost-effectiveness at max incentive ($/ton)	Incentive amount based on user defined cost-effectiveness ($)	User defined cost-effectiveness limit ($/ton)	User defined incentive amount ($)	Cost-effectiveness based on user defined incentive amount ($/ton)	GHG Cost-Effectiveness (MTCO2e/$)
29,750.00	2,938.91	-		28,000.00	2,766.04	0.01
4,000.00				4,000.00		-

Step 3: Estimate GHG Emission Reductions and Selected Co-benefits for the Proposed Project Using the FARMER Benefits Calculator Tool

As shown in Figure 45, the GHG & Co-Ben Aggregate tab displays GHG reductions (or an increase) and Co-Benefit reductions for each of the 8 project types aggregated.

Figure 45: Screenshots of results shown in GHG and Co-Ben Aggregate Tab

GHG Reductions, Criteria Pollutants, and Co-Benefits Aggregated by Project Type

Project Type	GHG Reductions (MTCO2e)	PM2.5 Reductions		NOx Reductions		Reactive Organic Gas Reductions		Diesel PM (PM10) Reductions		Fuel Reduction (Gallons)	Fuel Reduction (scf)	Fuel savings ($)	Fossil Fuel Energy Use Reductions (kWh)
		(tpy)	(lbs)	(tpy)	(lbs)	(tpy)	(lbs)	(tpy)	(lbs)				
Moyer On-Road Heavy-Duty Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-
FARMER On-Road Heavy-Duty Trucks (new/used)	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Road Agricultural Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-
Irrigation Pump Engines	146.53	0.03	601.30	0.37	7,397.76	0.05	990.91	0.03	653.58	11,478.41	-	33,075.67	(85,750.08)
ZEV_Ag_UTV	-	-	-	-	-	-	-	-	-	-	-	-	-
Off-Road Ag Equipment: 2 (or more)-for-1	-	-	-	-	-	-	-	-	-	-	-	-	-
Irrigation Pump Engines: 2 (or more)-for-1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ag Trade-Up #1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ag Trade-Up #2	-	-	-	-	-	-	-	-	-	-	-	-	-

The GHG Summary tab displays GHG reductions (or an increase) for each line item project. It also prorates the emissions by funding source as shown in Figure 46.

Figure 46: Screenshot of results shown in GHG Summary Tab

By project line item:		GHG Calculations (Quantification Period)											
		Not Prorated	FARMER GGRF*	FARMER GGRF Prorated	AQIF Prorated	ARFVTF Prorated	Tire Fund	GGRF (other) Prorated	GGRF (interest) Prorated	AQIP (interest) Prorated	ARFVTF (interest) Prorated	Tire Fund (interest)	Local Funding Sources Prorated
Project Type	District Supplied Project ID	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)	GHG Reductions (MTCO2e)
Irrigation Pump Engines	13579	146.53	146.53	146.53	-	-	-	-	-	-	-	-	-
Infrastructure (tied to project directly above)													

The Co-Benefits Summary tab displays changes in criteria pollutants, co-benefits, and key variables. Similar to the GHG Summary tab, prorated values for the aforementioned criteria pollutants, co-benefits, and key variables are also calculated as shown in Figure 47-Figure 48.

Figure 47: Screenshot of results shown in Co-Benefits Summary Tab

		Total							
Project Type	**District Supplied Project ID**	**Fuel Reduction (Gallons)**	**Fuel Reduction (scf)**	**Fuel savings ($)**	**Fossil Fuel Energy Use Reductions (kWh)**	**$PM_{2.5}$ Reductions (tpy)**	**NOx Reductions (tpy)**	**Reactive Organic Gas Reductions (tpy)**	**Diesel PM (PM10) Reductions (tpy)**
Irrigation Pump Engines	1	11,478.41	-	33,075.67	(85,750.08)	0.03	0.37	0.05	0.03
Infrastructure (tied to project directly above)									

Figure 48: Screenshot of results shown in Co-Benefits Summary Tab (cont.)

FARMER GGRF*								GGRF (other) Prorated							
Fuel Reduction (Gallons)	**Fuel Reduction (scf)**	**Fuel savings ($)**	**Fossil Fuel Energy Use Reductions (kWh)**	**PM2.5 Reductions (tpy)**	**NOx Reductions (tpy)**	**Reactive Organic Gas Reductions (tpy)**	**Diesel PM (PM10) Reductions (tpy)**	**Fuel Reduction (Gallons)**	**Fuel Reduction (scf)**	**Fuel savings ($)**	**Fossil Fuel Energy Use Reductions (kWh)**	**PM2.5 Reductions (tpy)**	**NOx Reductions (tpy)**	**Reactive Organic Gas Reductions (tpy)**	**Diesel PM (PM10) Reductions (tpy)**
11,478.41	-	33,075.67	(85,750.08)	0.03	0.37	0.05	0.03	0	0	0	0	0	0	0	0

Administrative Step: Fiscal Reporting

Based on the dates entered in the "Project Profile" tab and on the funding amounts entered in the "Funding Inputs-Incentive Calcs" tab, air districts can track their fiscal spending based on funding source and fiscal year within a given quarter. Note: for the "Fiscal Reporting Summary" tab to work properly, air districts must fill out the required input fields as well as specify the applicable quarterly reporting period in the "Air District Info" tab.

Figure 49: Screenshot of Fiscal Reporting Summary tab

	Funding Source	Fiscal Year	Share of Project Implementation Funding (%)	Total Project Funding	Total Project Implementation Funding	Total Funding Allocation		Total Interest and Revenue Earned ($)		Total project funding under contracts	Percent project funding under contract or obligated	Remaining project funding available		Total project funding expended or liquidated	Percent project funding expended or liquidated	Project funding available for expenditure/liquidation
	GGRF	FY 2017-2018				$ -				$ 32,000.00		$ (32,000.00)		$ 32,000.00		$ (32,000.00)

Figure 50: Screenshot of Fiscal Reporting Summary tab

	Project implementation funds expended during reporting period	Total project implementation funds expended through reporting period	Percent project implementation funding expended	Remaining balance of project implementation funds
				$ -

Example: Project Implementation Costs

Within the FARMER Benefits tool, the air districts can report on costs associated with implementing the program/project. For example, staff may have to travel to conduct outreach regarding the funding opportunities. Table 19-Table 20 lists an example of how such project implementation related information should be entered into the Project Implementation Costs tab (Figure 51).

Table 19: Project Implementation Costs

FARMER Benefits Calculator Tool Headings: "Project Implementation Costs" Tab	User-Defined Inputs
Implementation Cost Category	Staff/Jobs
Title, Job Classification, or Trades (e.g., air quality specialists, accountants, field assistants, and staff technicians)	Staff
Total Funded Staff Hours (hrs)	160
Average Hourly Wage ($)	30
Hourly Fringe Costs	10
Hourly Indirect Costs ($)	5
Other Implementation Cost ($)	
Description of Job Quality	This is an example of a written description: Position(s) funded are fulltime, include benefits (e.g., health insurance, paid time off, potential for career advancement, etc.), and on-the-job training.
Description/Justification	This is an example of a written description: Staff were needed for one month to administer the program.

Table 20: Project Implementation Costs

FARMER Benefits Calculator Tool Headings: "Project Implementation Costs" Tab	User-Defined Inputs
Implementation Cost Category	Travel
Title, Job Classification, or Trades (e.g., air quality specialists, accountants, field assistants, and staff technicians)	Not Applicable
Total Funded Staff Hours (hrs)	Not Applicable
Average Hourly Wage ($)	Not Applicable
Hourly Fringe Costs	Not Applicable
Hourly Indirect Costs ($)	Not Applicable
Other Implementation Cost ($)	1000
Description of Job Quality	Not Applicable
Description/Justification	This is an example of a written description: staff had to travel to public workshops and conducted outreach on the funding opportunities.

Figure 51: Screenshot of Project Implementation Costs tab filled in with inputs

Project Implementation Costs Incurred During				Q1 2019					
Implementation Cost Category	**Title, Job Classification, or Trades (e.g., air quality specialists, accountants, field assistants, and staff technicians)**	**Total Funded Staff Hours (hrs)**	**Average Hourly Wage ($)**	**Hourly Fringe Costs ($)**	**Hourly Indirect Costs ($)**	**Salary Costs ($)**	**Other Implementation Costs ($)**	**Description of Job Quality**	**Description/Justification**
Staff/Jobs	Staff	160	$ 30.00	$ 10.00	$ 5.00	$ 7,200.00		This is an example of a written description: Position(s) funded are fulltime, include benefits (e.g., health insurance, paid time off, potential for career advancement, etc.), and on-the-job training.	This is an example of a written description: Staff were needed for one month to administer the program.
Travel							$ 1,000.00		This is an example of a written description: staff had to travel to public workshops and conducted outreach on the funding opportunities.